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ABSTRACT

Concern for the consequences of educational programs as well as their processes is the focus of this study. The point is made that most evaluations of basic education programs are inadequate for two reasons: (1) The economic aspects of remedial education for the disadvantaged are infrequently studied; and (2) Most evaluations are based on unsophisticated research designs. It is also pointed out that to society, the primary economic benefit of basic education programs is the increase in trainee earnings during the posttraining period, which are directly attributable to remedial educational instruction. Three problems, however, which must be considered in measuring these benefits are: (1) Distinguishing between permanent and transient changes in earnings, (2) Married women with no need or desire to work, and (3) A worker who chooses to reduce his work effort. Possible evaluation designs include: the income equivalency approach, the before-and-after design, the quasi-experimental approach, and the true experiment. It is concluded that basic education programs should be designed to include an evaluation component as part of their normal administrative procedure. It is also concluded that the knowledge gained from evaluation should be funneled back into the program to produce more effective program operation. (Author/CK)

EVALUATING BASIC EDUCATION PROGRAMS FOR ADULTS: SOME CONCEPTUAL AND METHODOLOGICAL PROBLEMS*

by

Myron Roomkin**

Adult educators have always been concerned with the effectiveness of basic education programs for adults. Even a cursory reading of the literature reveals an enormous amount of research dealing with such aspects of program operation as pupil recruitment, instructional techniques and curriculum design. Recently, however, there are indications that the focus of research in this field is shifting. Although we are still concerned with developing effective methods of instruction, we are also beginning to examine the consequences of remedial education programs.[1] That is, we are concerned with the consequences of programs as well as their processes. This newer research focus is often called program evaluation research.

As an adult educator, I welcome the new concern for program evaluation. But as an economist, I find most evaluations of basic education programs to be inadequate, for two reasons. First, the economic aspects of remedial education for the disadvantaged are infrequently studied; and second, most evaluations are based on unsophisticated research designs.

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[1]See, for example, Ronald W. Shearon, "Evaluating Adult Basic Education Programs," Adult Leadership, Vol. 19, No. 1 (May, 1970). Furthermore, a national evaluation of adult basic education, encompassing both process and outcome evaluation considerations, is currently being conducted under a grant from the U. S. Office of Education. For a brief description of this study, see System Development Corporation, "Data Analysis Plan for Longitudinal Evaluation of the Adult Basic Education Program." (Mimeographed.)

Under the assumption that adult educators will face continued encouragement from funding agencies to conduct evaluations, this paper discusses these issues and offers some recommendations for upgrading our evaluative efforts. The premise of the paper is that evaluators of basic education can learn a great deal from previous evaluations of government-funded vocational training programs, conducted under the Manpower Development and Training Act and other legislative authorizations.[2]

Economic Aspects of Basic Education

It is doubtless true that basic education programs have as their immediate goal the improvement of individual levels of educational achievement. However, most of the 28 different, federally-funded programs[3] are based on the proposition that improved achievement will translate directly into economic gain through the mechanism known as the labor market. In this sense, basic education programs are, to varying degrees, training programs in the broadest of occupational skills--general academic education. Because of its relationship to employment and earnings, basic education shares similar goals with other government-funded manpower development and policies and programs.

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[2]A compilation of these studies can be found in Gerald G. Somers, Retraining the Unemployed (Madison, Wisconsin: University of Wisconsin Press, 1968). A summary of the principal evaluation studies of training programs is presented by Einar Hardin, "Benefit-Cost Analyses of Occupational Training Programs: A Comparison of Recent Studies," in G. G. Somers and W. D. Wood (eds.), Cost Benefit Analysis of Manpower Policies, Proceedings of a North American Conference (Kingston, Ontario: Hanson and Edgar, Ltd., 1969), pp. 97-118.

[3]For a complete listing of federally-funded basic education programs, see Greenleigh Associates, Inc., Inventory of Federally Funded Adult Basic Education Programs: Report to the President's National Advisory Committee (New York: Greenleigh Associates, Inc., 1968).

As I have argued elsewhere:

> Given the Federal government's involvement in basic education programs--in initiating, financing, and monitoring programs--it is appropriate for the government to determine the economic efficiency of these programs. It is an economic fact of life that federal funds for anti-poverty programs [and I would add manpower programs] are limited, while at the same time, programs such as institutional occupational training, on-the-job instruction and even income maintenance schemes are offered as alternatives to basic educational instruction.[4]

Thus, the burden falls on adult educators to demonstrate a satisfactory level of economic performance at minimal costs, compared to alternative programs and policies. In the jargon of economics, the benefits and costs of basic education must be identified and measured in similar units, usually constant dollars.

As a word of caution, intuitive definitions of program benefits and costs may be erroneous. Previous evaluations of government-funded training programs have found it useful to specify different evaluative contexts when distinguishing between these concepts. Much depends on whether an evaluator approaches the problem from the perspective of society as a whole, the interests of an administering agency, or the viewpoint of individual program participants.

Programs financed with public funds must be evaluated in terms of their contribution to general welfare and the costs of alternative uses of public funds. Similarly, a rational individual must choose between many alternative paths to self-improvement. These, then, are private gains which should be compared with private costs, that is, the cost to individuals for

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[4] Myron Roomkin, "The Benefits and Costs of Basic Education for Adults: A Case Study," in U. S. Congress, Joint Economic Committee, (tentatively titled) A Compendium of Papers on Cost-Benefit Analysis, forthcoming.

participating in basic education instruction. The economic considerations of an administering agency are often different than those of either society as a whole or individual trainees. The agency context, however, will also vary between programs, making generalizations almost impossible. Consequently, the following discussion is limited to identifying social and private benefits and costs.

Social Economic Benefits and Costs

To society, the primary economic benefit of basic education programs is the increase in trainee earnings during the posttraining period, which are directly attributable to remedial educational instruction. Such a gain could be the result of increased hourly wage rates or increased hours of employment. Society would also view as beneficial any increase in post-training employment, or conversely, any reduction in the average unemployment rate for members of the target population. Moreover, an acknowledged economic benefit of government training programs of all types (but one which is not easily measured), is the impact of training on the stability of prices, i.e., the rate of inflation. If inflation is partly the result of labor market shortages, then educational programs can have some effect on increasing the supply of labor at given quality levels. A crude proxy for this labor supply effect is the increase in labor force participation rates displayed by trainees. Finally, because remedial instruction can lead to continued training in occupational skills, the extent to which graduates of basic education programs enter skill training programs is also a direct benefit for society.

However, the measurement of these benefits often involves confronting difficult conceptual problems. I have selected three such problems which are

particularly thorny. First, in assessing the level of trainee earnings in the posttraining period, we must distinguish between permanent changes in earnings and those which are of a transient variety. Only changes in earnings that persist for reasonable periods of time and that withstand changing labor market conditions should be counted.

Second, females pose special problems in the measurement of program benefits. A married woman with no desire or need to work will display zero scores on all economic benefit measures. Aggregate analysis of program participants regardless of sex may understate the economic benefits of those workers fully committed to the labor force. This problem requires that benefits be computed on an average basis for each sex group with further distinctions made for noncommitted, partially committed and fully committed workers.

Finally, a rational worker, who receives additional earnings as a result of remedial education, may choose to reduce his work effort, that is, maintain his total weekly earnings at a previous level but increase his leisure time. Thus, it is important to distinguish between an hourly wage benefit and a total earnings benefit.

As for the social costs of programs, we can identify the following cost items which should be included in a calculation of total social cost:

1. Total operating or instructional costs;
2. Total cost of allowances paid trainees while in training;
3. Total opportunity costs or foregone earnings of trainees while in training, since their earnings are lost to society;
4. Prorated expenses of shared facilities such as buildings;
5. The cost of idle capacity resulting from less than 100 per cent utilization of instructional resources.

Some have argued that the opportunity costs of training programs are zero because any job vacated by a trainee at the time of his entrance would be filled by someone of comparable quality out of the ranks of the unemployed. But in fact, this is an empirical question. Not all trainees have prior employment, and many employers often do not fill vacancies.

Private Benefits and Costs

The costs and benefits for individual participants in basic education programs require somewhat different calculations. Private benefits usually include the after-tax income of trainees, minus any reduction in transfer payments (i.e., government assistance payments such as unemployment compensation and welfare payments).

The private costs of instruction consist only of those costs of instruction borne directly by the trainee. These should include the foregone earnings of a trainee while in training, minus his living or trainee allowance plus the costs of training-related expenses (i.e., transportation expenses or school supplies). Since stipends or trainee allowances are often sizable--and frequently larger than the foregone earnings of trainees--we can see how private benefits often compare more favorably to private costs than social benefits do to social costs. In a case study evaluation of basic education financed under the Manpower Development and Training Act, the size of the stipend was found to be an important reason for trainee participation in the program.[5]

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[5] Ibid.

Relating Benefits to Costs

Both from the social or private viewpoint, knowledge of either the benefits or the costs is inadequate for evaluation pruposes. Economic evaluations require that costs and benefits be compared within an appropriate framework.

The first step is to project both costs and benefits over an appropriate time horizon. For example, an increase in the posttraining hourly earnings of trainees, directly attributable to basic education should be summed over the many future hours of the individual's work life. This procedure is known as taking the present value of the benefit stream.[6] Typically, only the benefits stream requires this calculation, since all costs of basic education are usually borne during the life of the training program.

Armed with the present value of benefits and costs, a comparison between the two can be made in many different manners. First, total or average benefits can be divided by total or average costs respectively, producing a benefit-cost ratio. Ratio values less than one are considered very poor performance from both the social and private perspectives. Ratios equal to one should not be looked on with pride either, for they indicate that, other things being equal, society or trainees could have benefited equally from a direct cash subsidy in lieu of education. Rather, ratios exceeding one indicate good program performance; the larger the value the better.

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[6] A formula for computing the present value of a benefit or a cost stream (PV) is:

$$PV = \sum_{j=0}^{N} Y_j (1 + i)^{-j}$$

where j is the length of the stream, Y_j is the yearly benefit or cost and i is an appropriate rate of discount.

More sophisticated methods for comparing costs and benefits require the computation of a program rate of return. As businessmen compute a return on their investment in physical capital, the government or an individual can compute a return on an investment in human capital.[7] Alternatively, we can assume a value for the rate of return and calculate the time required to recoup this investment.[8]

Quite frequently the goals of basic education programs cannot be expressed in dollar equivalents, but it is still possible to relate such aspects of program performance to cost considerations. As long as we have confidence in our measures and can develop ratio scales, the effectiveness of a program can be assessed within a cost-effectiveness framework. Any index of program performance, "P," can be related to program costs, "C," in ratio form, such that

$$\frac{\Delta P}{C} = \text{a cost per unit of change in } P .$$

Interestingly, "P" may also be a probability, measuring, for example, the conditional likelihood that a graduate of basic education will continue his education during the posttraining period.

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[7] The rate of return can be found by solving for r in:

$$0 = \sum_{j=0}^{n} (Y_j - X_j)(1 + r)^{-j}$$

where Y_j = the benefit in year j, X_j = the cost in years, j = the length of the stream and r = the rate of return.

[8] Solving for j in the above equation, we can compute a "payback period" to the investment.

The Methodology of Evaluation

The literature dealing with program evaluations in all disciplines is voluminous. This discussion, therefore, highlights only a few important issues.[9]

Estimating Benefits

To produce accurate estimates of program benefits an evaluative effort should (1) select an appropriate research design, (2) specify and collect appropriate data, (3) isolate basic education's effects, and (4) reject alternative causal factors. Previous evaluations of basic education programs, even those not dealing with essentially economic considerations, often fall short on one or all of these requirements.

Design. Evaluators have used four different research designs to evaluate basic education. The first, and perhaps simplest design can be called the income equivalency approach. Examples of this design can be found in the work of Roomkin[10] and Levin and Slavet.[11] The income equivalency approach assumes that grade levels of educational achievement, measured on standardized achievement tests, are reasonably equivalent to grade levels

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[9] The methodology of evaluating manpower and training programs is extensively discussed in Michael E. Borus and William R. Tash, Measuring the Impact of Manpower Programs: A Primer (Ann Arbor, Michigan: Institute of Labor and Industrial Relations, University of Michigan-Wayne State University, 1970) and Glen G. Cain and Robin G. Hollister, "Evaluating Manpower Programs for the Disadvantaged," in Somers and Wood, op. cit., pp. 119-151.

[10] Myron Roomkin, "An Evaluation of Adult Basic Education under the Manpower Development and Training Act in Milwaukee, Wisconsin" (Ph.D. dissertation, University of Wisconsin, 1971).

[11] Melvin R. Levin and Joseph S. Slavet, Continuing Education (Lexington, Ky.: Health Lexington Books, 1970), pp. 36-41.

of formal educational attainment. Thus, trainee achievement gain can be translated into annual earnings gain by computing the dollar equivalency in annual earnings associated with a specific change in educational attainment for a known population.

The inadequacies of this design are obvious. Achievement is not necessarily a perfect proxy for attainment. Second, educational achievement scores are often based on unvalidated or poorly validated tests. Third, detailed data on earnings and education are not always available, and available data are not always current. But the design's biggest weakness is its reliance on an untested proposition: Trainees will succeed in the labor market in direct relation to their within program performance. Findings stemming from this approach beg further evaluative efforts. The approach should only be used where evaluators must function under the most stringent research constraints.

A second, frequently used approach is the before-and-after design. Trainees are studied after a reasonable time period and their posttraining status is compared to their pretraining status. Patten and Clark,[12] Pearce[13] and Kohler and Seaman[14] have conducted case study evaluations using the before-and-after comparison. Though more rigorous than the income

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[12] Thomas Patten, Jr. and Gerald E. Clark, Jr., "Literacy Training and Job Placement of Hard-Core Unemployed in Detroit," Journal of Human Resources, Vol. 3, No. 1 (1968), pp. 25-46.

[13] Frank C. Pearce, "Adult Education: Evaluation Through Research," June, 1966.(Mimeographed.)

[14] Emmett T. Kohler and Don F. Seaman, "An Educational and Socioeconomic Description of Adult Basic Education Students in Mississippi," Journal of Human Resources (Fall, 1970), pp. 511-518.

equivalency approach, the before-and-after approach fails to answer one key question: What would have happened to trainees had they not participated in the program?

The third design, the quasi-experimental approach, though not a perfect procedure, allows us to at least address this question. As utilized by Roomkin,[15] and Greenleigh Associates[16] and as currently being utilized by the System Development Corporation,[17] the quasi-experimental design employs a specific group of nontrainees, sometimes called a control or comparison group, to determine the level of trainee performance in the absence of remedial education. What fault there is with this approach stems from our inability to produce a control group (perfectly) matched to the trainee group on all relevant characteristics and variables.

Under the fourth design, the true experiment, the control group contains individuals who are perfectly matched to the experimental, or treatment group. I have identified only one instance where a true experimental evaluation of basic education was conducted. In a study by Brazziel,[18] enrollees were randomly assigned to groups. Interestingly, Brazziel's study

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[15] Roomkin, "The Benefits and Costs of Basic Education for Adults: A Case Study," op. cit.

[16] Greenleigh Associates, Inc., Field Test and Evaluation of Selected Adult Education Systems (New York: Greenleigh Associates, Inc., 1966).

[17] System Development Corporation, "A Longitudinal Evaluation of Adult Basic Education Programs" (in progress).

[18] William Brazziel, "Effects of General Education in Manpower Programs," Journal of Human Resources, Vol. 1, No. 1 (1966), pp. 39-44.

employed a placebo group--a sort of no-training, training program. Desirable as is the true experimental approach, a widespread adaptation of this design is very unlikely. More often than not, evaluators function after the fact, usually after trainees have left the program. Furthermore, the assignment of individuals to control or treatment groups on a random basis raises serious questions of equity in program administration.

In the absence of random assignments, the best control group is one containing nontrainees with the identical characteristics and qualities of trainees, selected from a population of individuals who had equal knowledge of, and access to, remedial educational programs. A control group should be matched to the treatment group on the following characteristics:

1. age
2. sex
3. race
4. employment status before training
5. educational attainment
6. educational achievement (if possible)
7. motivation or desire to succeed.

The last two of these, of course, will be difficult to measure--but, I stress their importance on the basis of experience. In the study of trainees, under the Manpower Development and Training Act previously noted,[19] these variables were not used for matching purposes and motivational difference between the groups biased the results.

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[19] Myron Roomkin, "An Evaluation of Adult Basic Education under the Manpower Development and Training Act in Milwaukee, Wisconsin," op. cit. Also see Myron Roomkin, "Employment and Earnings Effects of Basic Education for Adults: The Milwaukee MDTA Experience." (Mimeographed.)

Frequently evaluators select program dropouts or no-shows to serve as a control group. It should be remembered, however, that dropping out of a basic education program is not analogous to premature termination from a vocational training program. Basic education dropouts, by definition, have received some instruction and are therefore a poor basis for comparison. Second, as learned from the evaluations of skill training programs, many dropouts leave to accept employment. And some leave because they lack adequate motivation. In the final analysis we have very little control over the quality or quantity of dropouts or no-show trainees.

Alternative sources of control groups should be developed. In fact, wherever possible, multiple control groups should be employed. Some success has been achieved with control groups randomly selected from the files of the local Employment Service or welfare department.[20] In a quasi-experimental design, no control group is perfect. However, if we understand the nature of the bias, we can control for it.

Data Specification and Collection. Evaluation starts with baseline data, generated by the program administrators themselves. Experience suggests that enrollment and performance records of students are not always verified and up-to-date. There is no substitute for valid information in the evaluation process.

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[20]See Glen C. Cain and Gerald G. Somers, "Retraining the Disadvantaged," in Cathleen Quirk and Carol Sheehan (eds.), Research in Vocational and Technical Education (Madison, Wisconsin: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1967), pp. 27-44.

The list of important information needed for evaluation is endless, but the resources and opportunities for measurement are limited. A prudent determination of important variables is required. Of highest priority are measures of performance, including economic performance indicators. Some efficient allocation of research resources can be achieved by selecting variables for study on the basis of their theoretical importance.

For postprogram information, most evaluations employ the follow-up method of data retrieval and use personal interviews. Though costly, this seems to be the only viable way to obtain longitudinal data on both control and treatment samples. In specifying the length of the follow-up period, researchers must balance three concerns:

1. a desire to measure permanent rather than transient performance;
2. a preference for high rather than low response rates; and
3. a recognition that program graduates enter continuing education programs.

I would also urge that former program participants be retested to determine the degree of educational achievement retention.

Finally, because we must use survey research techniques, some reduction in sample size will be encountered during the follow-up period. The acts of locating and interviewing persons in this target population are especially problematic.

Isolating the Effects of Basic Education. Rigorous analysis of collected data requires using multivariate statistical techniques. Multiple regression analysis, because it yields estimates of the sign and magnitude of relationship, is, in my opinion, the most desirable technique. Other

statistical techniques such as discriminant analysis, analysis of variance and factor analysis should be used where appropriate.

Within a regression framework, the simplest evaluation model for basic education is:

$$Y_{t+1} = a + bY_t + \sum_{i=1}^{N} c_i X_i + dE + \mu$$

where Y_t and Y_{t+1} are measures of performance indicator Y in pre- and posttraining periods, t and $t+1$, respectively; a is a constant, ΣX_i is a set of control variables, usually including age, sex, race, educational attainment and time exposed to the labor market; E is a dummy variable representing program participation, and μ is the error term. The regression coefficient on E, d, is our best guess estimate of the benefit resulting from basic educational instruction.

The model, however, should be elaborated to reflect other relevant conditions. For example, a large number of basic education trainees continue their education after completing remedial educational instruction. A regression model reflecting such behavior takes the following equational form:

$$Y_{t+1} = a + bY_t + \sum_{i=1}^{N} c_i X_i + dE + eT + f(E \times T) + \mu \ .$$

By adding variables T, representing vocational training, and $T \times E$, representing combined basic education and vocational training, we are able to isolate the effects of these additional training programs on the dependent variable.

Multiple regression analysis also offers a direct test of control group-treatment group comparability. As indicated even a control generated through random assignments could lose its appropriateness during the survey portion of a study. Through regression analysis, a test for group comparability can be performed, by estimating three separate regression equations:

$$(1) \qquad Y_{t+1}^{(C)} = a + bY_t + \sum_{i=1}^{N} c_i X_i + \mu$$

$$(2) \qquad Y_{t+1}^{(BE)} = a + bY_t + \sum_{i=1}^{N} c_i X_i + \mu$$

$$(3) \qquad Y_{t+1}^{(C+BE)} = a + bY_t + \sum_{i=1}^{N} c_i X_i + \mu$$

where superscripts C, BE, and C+BE designate control, treatment and combined samples of both samples, respectively. The hypothesis is that the corresponding coefficients in each equation--a, b, and c--are equal. Or, phrased verbally, both control and treatment samples are drawn from the same larger population.[21]

Alternative Hypotheses. Like any statistical tool, regression procedures are as valid as the underlying assumptions and model on which they are based. The exclusion of a key variable in the above equations will drastically bias the results. It is for this reason competing explanations of the differential between program participants and control observations should be explored.

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[21] A general description of the test can be found in J. Johnston, Econometric Methods (New York: McGraw-Hill, 1963), p. 136.

The literature on evaluation suggests the following competing hypotheses.

1. Trainees gain economically because they displace nontrainees in the labor market. Thus, what is gained by one group is lost by another. This is called the displacement effect.
2. The status of nontrainees was improved when trainees left the labor market. This is called the vacuum effect.
3. Trainees gain because they have special access to information on training programs and job opportunities. The importance of this factor should be closely examined when programs are coordinated by local offices of the Employment Service.
4. Trainees gain from the certification of a program rather than from any true quality changes. We are beginning to call this credentialism or a sheepskin effect.

Measuring Costs

Typically costs are easier to measure. Most are available directly from budget statements. However, opportunity costs will not appear on any budget sheet. These can only be secured directly from the control group. A faulty control group, therefore, will not only yield inaccurate benefit levels but poor cost estimates as well.

Some Problems in Benefit-Cost Analysis

The calculation of present values and cost-benefit relationships requires many operating assumptions. For instance, the selection of an appropriate rate of discount or the projection of earnings streams into the future are oftentimes arbitrary decisions. It is for this reason that a set of benefit-cost calculations rather than a single calculation should be made,

employing a wide range of varying assumptions. Multiple measures of program performance will give policy-makers flexibility in comparing the performance of many programs.

Concluding Remarks

The previous discussion has been heavily weighted towards economic considerations. Obviously, economics constitutes only one facet of basic education for adults. However, the desire to utilize remedial education to obtain many different changes in the behavior of the disadvantaged, poses important problems to evaluators. Administrators must decide on an a priori basis the relative weight to be given each desired outcome. Thus, poor performance in one area can be offset by adequate performance in others. In the absence of legislative directions, program administrators should reach agreement on what they consider to be the relative importance of program goals.

In conclusion, whether or not my suggestions for the content and format of evaluations are accepted, I urge that basic education programs be designed to include an evaluation component as part of their normal administrative procedure. Program evaluation should be planned, just as we plan program curricula. Ample resources should be set aside to conduct an evaluation. Control groups should be identified early. Enrollment information should be kept current and all data should be verified. Finally, evaluation is of little value if results are not utilized. At a minimum, the knowledge gained from evaluation should be funneled back into the program to produce more effective program operation.